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TITLE OF THE INVENTION

Satellite Broadcast Receiving and Distribution System

BACKGROUND OF THE INVENTION

1. Field of the Invention

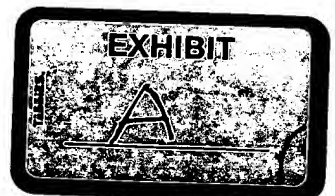
The present invention relates generally to a satellite broadcasting receiving and distribution system and more particularly to a broadcasting receiving and distribution system that will allow for the transmission of vertical and horizontal or left-hand circular and right-hand circular polarization signals to be transmitted simultaneously via a single coaxial cable.

2. Description of the Prior Art

Satellite broadcasting has become very popular throughout the United States. Conventionally, broadcast signals are transmitted through an artificial satellite at very high frequencies. These frequencies are generally amplified and are processed by a particular device after received by an antenna or antennas and prior to application to a conventional home television set or the like.

The device is composed of an outdoor unit generally associated with the antenna and an indoor unit generally associated with the television set or the like and both units are coupled via a coaxial cable.

A problem associated with these types of systems is that they are designed to accept signals through a line of sight. Accordingly, if the satellite is not visual from a



building, then the signal cannot be transmitted. Thus, these systems are rendered useless for high-rises, hospitals, school, and the like. These systems are limited in usage, and as such, can only be utilized in residential homes.

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As an example, US Patent No. 5,301,352 issue to Nakagawa et al. disclose a satellite broadcast receiving system. The system of Nakagawa et al. includes a plurality of antennas which, respectively, include a plurality of output terminals. A change-over divider is connected the plurality of antennas and have a plurality of output terminals. A plurality of receivers are attached to the change-over divider for selecting one of the antenna. Though this system does achieve one of its objects by providing for a simplified satellite system, it does, however, suffer a major short coming by not providing a means of receiving satellite broadcasting for individuals who are not in direct line of sight to the antennas. This system is silent to the means of simultaneously transmitting vertical and horizontal polarized signals via a single coaxial cable.

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US Patent No. 5,206,954, issue to Inoue et al. disclose yet another satellite system that includes an outdoor unit that is connected to a channel selector. In this embodiment, the satellite signal receiving apparatus receives vertically and horizontally polarized radiation signals at the side of a receiving antenna. The signals are

then transmitted, selectively to provide for either one of the vertically or horizontally polarized signals to be transmitted. This design and configuration provides for one coaxial cable to be utilized, but does not provide for the vertical and horizontal signals to be transmitted simultaneously, but rather, selectively.

None of these previous efforts, however, provide the benefits intended with the present invention. Additionally, prior techniques do not suggest the present inventive combination of component elements as disclosed and claimed herein. The present invention achieves its intended purposes, objectives and advantages over the prior art device through a new, useful and unobvious combination of component elements, which is simple to use, with the utilization of a minimum number of functioning parts, at a reasonable cost to manufacture, assemble, test and by employing only readily available material.

#### SUMMARY OF THE INVENTION

The present invention provides a satellite broadcast receiving and distribution system that will permit for the transmission of vertical and horizontal or left-hand circular and right-hand circular polarization signals simultaneously via a single coaxial cable. The system of the present invention will accommodate two different polarity commands from two or more different sources at the same time. This satellite broadcast receiving and distribution system of the present invention will provide for the signals received from the satellite to be converted to frequencies which the present day amplifiers can transport. This will permit for the signals to travel via existing wiring in buildings, high-rises, hospitals, and the like so that satellite broadcasting can be viewed by numerous individuals by way of a single satellite antenna.

The satellite broadcast system consists of a satellite antenna which receives the polarized signals. These polarized signals are transmitted to a head-in processor and are converted to different frequencies and polarities in order to render the different signals to be transmitted simultaneously. Hence, the head-in processor will permit for the transmission of signals of two different frequencies and polarities to be transmitted simultaneously and will also accommodate two different polarity commands from two or more different sources at the same time via a single cable. This cable is coupled to a head-out processor. These

signals, once in the head-out processor, will be converted to frequencies and polarities that are required for the source (i.e. television). Once converted, the signals are transmitted to a satellite receiver. This satellite receiver is coupled to the source.

Accordingly, it is the object of the present invention to provide for a satellite broadcast receiving and distribution system that will convert different frequencies and different polarized signals in order to permit the signals to be transmitted via a single coaxial cable.

It is another object of the present invention to provide for a satellite broadcast receiving and distribution system that will provide service to mid/high-rise office buildings, condominiums, schools, hospitals and the like via a single satellite.

A final object of the present invention, to be specifically enumerated herein, is to provide a satellite broadcast receiving and distribution system in accordance with the proceeding objects and which will conform to conventional forms of manufacture, be of simple construction and easy to use so as to provide a system that would be economically feasible, long lasting and relatively trouble free in operation.

Although there have been many inventions related to satellite broadcast receiving and distribution systems, none of the inventions have become sufficiently compact, low cost, reliable enough to become commonly used, and all still

require the use of two cables in order to transmit the full band width signals of the different polarized frequencies simultaneously. The present invention meets the requirements of the simplified design, compact size, low initial cost, low operating cost, ease of installation and maintainability, and minimal amount of training to successfully employ the invention.

The foregoing has outlined some of the more pertinent objects of the invention. These objects should be construed to be merely illustrative of some of the more prominent features and application of the intended invention. Many other beneficial results can be obtained by applying the disclosed invention in a different manner or modifying the invention within the scope of the disclosure. Accordingly, a fuller understanding of the invention may be had by referring to the detailed description of the preferred embodiments in addition to the scope of the invention defined by the claims taken in conjunction with the accompanying drawings.

**BRIEF DESCRIPTION OF THE DRAWINGS**

Fig. 1 illustrates a block diagram representing the satellite broadcast signal receiving and distribution system according to the present invention.

Similar reference numerals refer to similar parts throughout the several views of the drawings.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

As illustrated in fig. 1, the satellite system of the present invention includes a receiving satellite that is connected to a head-in equipment frequency processor 44. It is at this head-in equipment frequency processor where the signals (Vertical-polarized signals and Horizontal-polarized signals or left-hand circular and right-hand circular polarization signals) are received simultaneously and then transmitted via a single coaxial cable 13 to the head-out receiver processor 45 or 46. From the receiver processor, the signals are transported to a satellite receiver 27 or 41 and to a source 29 or 43 (this figure illustrates a television as its source).

As illustrated, the receiving satellite 1 is connected to a low-noise block converter (LNB) 2 for amplifying the respective polarized signals (Vertical-polarized signals and Horizontal-polarized signals or left-hand circular and right-hand circular polarization signals). This LNB is coupled to the head-in equipment frequency processor 44. Accordingly, after signals are received, they pass the low-noise block converter 2, to provide for the signals to enter the head-in equipment frequency processor 44 (illustrated in dashed lines) via conduits 3 and 4.

The head-in equipment frequency processor 44 provides for the signals via lines 3 and 4 to be converted to the frequencies which the present day amplifiers can transport via converters 5 and 7, respectively. From the conduits 3

and 4, the signals or transponders are transmitted to a first converter or down converter 5 and a second converter or up converter 7, respectfully. These frequency converters convert the entered frequencies to frequencies which the present day amplifiers can transport.

The utilization of two converters permit for the acceptance of two signals or polarized transponders that are of a different frequency.

In the down converter 5, the transponders are converted down to a specified frequency. This specified frequency is the frequency that is required for the present day amplifiers to transport. The newly converted frequencies are amplified through the amplifying means 6. At means 6, the converted frequencies are amplified so not to create second harmonics. These signals are then transferred to a four way splitter 10.

In the up converter 7, the transponders are converted up to a specified frequency. The converted frequencies then are converted down via down converter 8. This process of converting up and then down provides for frequencies to be converted without difficulties and avoiding the forbidden conversion area.

The converted signals are transferred to the four way splitter 10 in order to combine the frequency of the amplifier signal of 6 and frequency from converter 8. To synchronized the system, the frequencies from the phase lock loop (PLL) transmitter 9 are transmitted to the splitter 10.

From 10, the signals are passed through an A.C. power separator 11 which routes 60 Volts power to a D.C. power supply of 18 Volts.

This will permit for the dual frequencies from the satellite dish to be transmitted simultaneously via a single coaxial cable 13. Dependent upon the length of the cable, an optional amplifier 14 can be coupled thereto. Power from a power source 16 is inserted into the lines via a power inserter 15. The signals are amplified, as needed, with an additional amplifier 17. It is noted that the amplifiers are optional and are dependent to the distance that the head-in frequency processor 44 is located from the head-out receiver processor 45 or 46. The power supply and power source 16 energize the head-in frequency processor 44.

From the single coaxial cable 13, the signals are adjusted via a tap 18 or 31 to permit for the appropriate decibels that is required for the head-out receiver processor 45 or 46.

The head-out frequency processor includes a plurality of embodiments. The design and configuration of the head-out frequency processor is dependent on the source in combination with the satellite receiver.

The first embodiment for the head-out receiver processor is illustrated in figure 1 and is represented by way of dashed lines 45. As seen in this head-out receiver processor, the simultaneously transmitted signals enter the processor via conduit 19. The conduit is coupled to a four

(4) way splitter 20. A phase lock loop (PLL) receiver 21 is coupled to the splitter 20 to permit for the signals to be locked to the proper and desired frequencies. From the splitter, the first frequency is transmitted to a first converter 22 in order to permit signals or transponders to be converted up to a specified frequency. This up converted signal is then transmitted to the satellite receiver 27 by way of a conduit 26.

The second frequencies are transmitted to a first or up converter 23 and then is transmitted to a second or down converter 24. This will permit for the signals to be converted to the desired frequency. The conversion of the signals from up to down provides the benefit of converting the frequencies without any mishap or error. This method of conversion will avoid the forbidden conversion area. This second or down converter 24 is coupled to the satellite receiver 27 via conduit 25. The signals received from the satellite 1 can then be transmitted to the source 29 by line 28.

As illustrated, this head-out receiver processor 45 is the reverse process of the head-in processor 44. This is to provide for the signals to reconvert to its original frequencies so as to provide for the satellite receiver and source to accept the signals. The single cable 13 accepts the signals at frequencies different than that of the source 29. Accordingly the head-out receiver processor 45 must reconvert the signals to the frequencies that are utilized

by the source. This design and configuration of the head-out receiver processor is dependent on the design and configuration of the satellite.

An alteration of the satellite receiver requires an alteration in the head-out receiver processor. This alteration is illustrated in figure 1 and is shown in outline and designated as reference 46. In this design and configuration, the satellite receiver utilizes only one wire 40 and accepts only one type of signals, at a time, such as left-hand circular or right-hand circular polarized signals.

As seen, the frequencies are tapped via 31. The tap 31 is coupled to the head-out receiver processor 46 via line 32 which is connected to a four (4) way splitter 33. To provide for the signals to be locked in proper frequencies, the four way splitter 33 is coupled to a phase lock loop (PLL) receiver 34.

From the splitter 33, the first signal is transmitted to a first or up converter 36 and then is transmitted to a second or down converter 37. The conversion of the signals from up to down provides the benefit of converting the frequencies without any mishap or error. This method of conversion will avoid the forbidden conversion area.

The signals, from the splitter 33 are transmitted to an up converter 35 which will inherently convert the signals.

A polarity switch 39 is connected to converters 35, 36, 37 in order to permit for the head-out receiver processor to be coupled to the satellite receiver 41 via a single cable

40 and a joining means 38 which is a four (4) way splitter. The satellite receiver 41 is connected by way of line 42 to a source 43.

It is noted that figure 1 illustrates the use of two head-out receiver processors, but in actuality, only one head-out receiver processor is utilized with the head-in processor 44. The type and embodiment for the head-out receiver processor is dependent to the combination of the satellite receiver and source that are utilized.

The satellite system of the present invention will permit for two signals of different frequency and polarities to travel simultaneously via a single coaxial cable. The use of this will provide for a satellite system that is versatile, economical, and compact. The usage of the single cable permits for a system that can accept satellite broadcasting in places that were previously rendered impossible. These places includes mid/high-rise office buildings, condominiums, hospitals, schools, etc. The unique design and configuration enables the signals to be transmitted via the existing wiring of the buildings. The only renovations that may need to be done is the upgrading of the existing amplifiers.

While the invention has been particularly shown and described with reference to an embodiment thereof, it will be understood by those skilled in the art that various changes in form and detail may be made without departing from the spirit and scope of the invention.

I claim:

1. A satellite broadcasting system comprising:

a satellite dish coupled to a low-noise block converter; and

said low-noise block converter is coupled to a first means of converting vertical polarization signals and horizontal polarization signals or left-hand circular polarization signals and right-hand circular polarization signals from <sup>a</sup>said satellite and transmitting simultaneously via a single coaxial cable for enabling two different frequencies and polarities to be transmitted simultaneously via said single coaxial cable.

2. A satellite broadcasting system as in claim 1 further comprising a second means ~~is~~ coupled to said first means;

said second means converts said vertical polarization signals and said horizontal polarization signals or said left-hand circular polarization signals and said right-hand circular polarization signals from said first means to frequencies for a source;

a satellite receiver is coupled to said second means;  
and

said source is coupled to said satellite receiver.

3. A satellite broadcasting system as in claim 2 wherein a power source is coupled to said first means and said power source powers said first means.

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A1 4. A satellite broadcasting system as in claim 2 wherein said second means provides for said signals to be converted separately and independently to said satellite receiver by a transmitting means.

5. A satellite broadcasting system as in claim 2 wherein said second means provides for a transmitting means for said signals to be selectively converted to said satellite receiver via a first cable coupled to said second means.

6. A satellite broadcasting system as in claim 5 wherein said transmitting means further includes a polarity switch for permitting said signals to be selectively converted to said satellite receiver.

7. A satellite broadcasting system as in claim 2 wherein said first means includes a first converting system for converting said signals of a first direction to a desired first frequency and polarization and a second converting system for converting said signals of a second direction to a desired second frequency and polarization.

8. A satellite broadcasting system as in claim 7 wherein said first converting system includes a first down converter which is coupled to an amplifier and said second converting system includes an up converted coupled to a second down converter and a joining means is coupled to said amplifier and said second down converter.

9. A satellite broadcasting system as in claim 8 wherein said joining means includes a four way splitter.

10. A satellite broadcasting system as in claim 9 wherein a phase lock loop transmitter is coupled <sup>to</sup> said four way splitter.

11. A satellite broadcasting system as in claim 4 wherein said second means includes a splitting means to split and divide said signals from said single coaxial cable to enable said signals to be transmitted to a first converting system for converting said signals of a first direction to a desired first frequency and polarization for said satellite receiver and a second converting system for converting said signals of a second direction to a desired second frequency and polarization for said satellite receiver, and said first converting system and said second converting system provide for said transmitting means.

12. A satellite broadcasting system as in claim 11 wherein said first converting system includes a first up converter which is coupled to said splitting means and said first down converter is coupled to a first down converter, said first down converter is coupled to said satellite receiver via a first conduit, said second converting system includes a second up converter coupled to said splitting means, and said second up converter is coupled to said satellite receiver via a second conduit.

13. A satellite broadcasting system as in claim 12 wherein said splitting means includes a four way splitter.

14. A satellite broadcasting system as in claim 13 wherein a phase lock loop receiver is coupled <sup>10</sup> said four way <sub>^</sub> splitter.

15. A satellite broadcasting system as in claim 6 wherein said second means includes a splitting means to split and divide said signals from said single coaxial cable to enable said signal to be transmitted to a first converting system for converting said signals of a first direction to a desired first frequency and polarization for said satellite receiver and a second converting system for converting said signals of a second direction to a desired second frequency and polarization for said satellite receiver, and said first

converting system and said second converting system provide for said transmitting means.

16. A satellite broadcasting system as in claim 15 wherein said first converting system includes a first up converter which is coupled to said splitting means and said first up converter is coupled to a first down converter, said first down converter is coupled to a joining means, said second converting system includes a second up converter coupled to said splitting means, and said second up converter is coupled to said joining means, said polarity switch is coupled to said first down converter and said second up converter, and said polarity switch is coupled to said first cable which is coupled to said satellite receiver.

17. A satellite broadcasting system as in claim 16 wherein said splitting means and said joining means each include a four way splitter, and a phase lock loop receiver is coupled said splitting means.

18. A satellite broadcasting system as in claim 8 wherein said second means includes a splitting means to split and divide said signals from said single coaxial to enable said signal to be transmitted to a third converting system for converting said signals of said first direction and a fourth converting system for converting said signals of said second direction.

19. A satellite broadcasting system as in claim 18 wherein said third converting system includes a second up converter which is coupled to said splitting means and said second up converter is coupled to a third down converter, said third down converter is coupled to said satellite receiver via a first conduit, said fourth converting system includes a third up converter coupled to said splitting means, and said third up converter is coupled to said satellite receiver via a second conduit.

20. A satellite broadcasting system as in claim 8 wherein said second means includes a splitting means to split and divide said signals from said single coaxial to enable said signals to be transmitted to a third converting system for converting said signals of said first direction to a desired first frequency and polarization for said satellite receiver and a fourth converting system for converting said signals of said second direction to a desired second frequency and polarization for said satellite receiver.

21. A satellite broadcasting system as in claim 20 wherein said third converting system includes a second up converter which is coupled to said splitting means and said second up converter is coupled to a third down converter, said third down converter is coupled to a second joining means, said fourth converting system includes a third up converter

coupled to said splitting means, and said third up converter is coupled to said second joining means, a polarity switch is coupled to said third down converter and said third up converter, and said polarity switch is further coupled to a conduit which is coupled to said satellite receiver, and said second joining means is coupled to said conduit.

# **ABSTRACT**

The present invention provides for a satellite system that will permit for the transmission of signals of two different frequencies and polarities to be transmitted simultaneously, also the system will accommodate two different polarity commands from two or more different sources at the same time. The satellite system of the present invention includes a satellite dish or antenna that receive signals. These received signals are then transmitted to a converter. A head-in frequency processor is coupled to the converter. This head-in frequency processor enables the different frequencies and polarities to be transmitted simultaneously via a single coaxial cable. This single coaxial cable is coupled to a head-out receiver processor which is connected to a receiver. This receiver is connected to a source. This unique design and configuration provides for the system that will permit for satellite broadcasting to occur in locations that are not in the line-of-sight path to the satellites. Accordingly, the satellite system of the present invention will permit satellite broadcasting in high-rises, hospitals, condominiums, schools, and the like.

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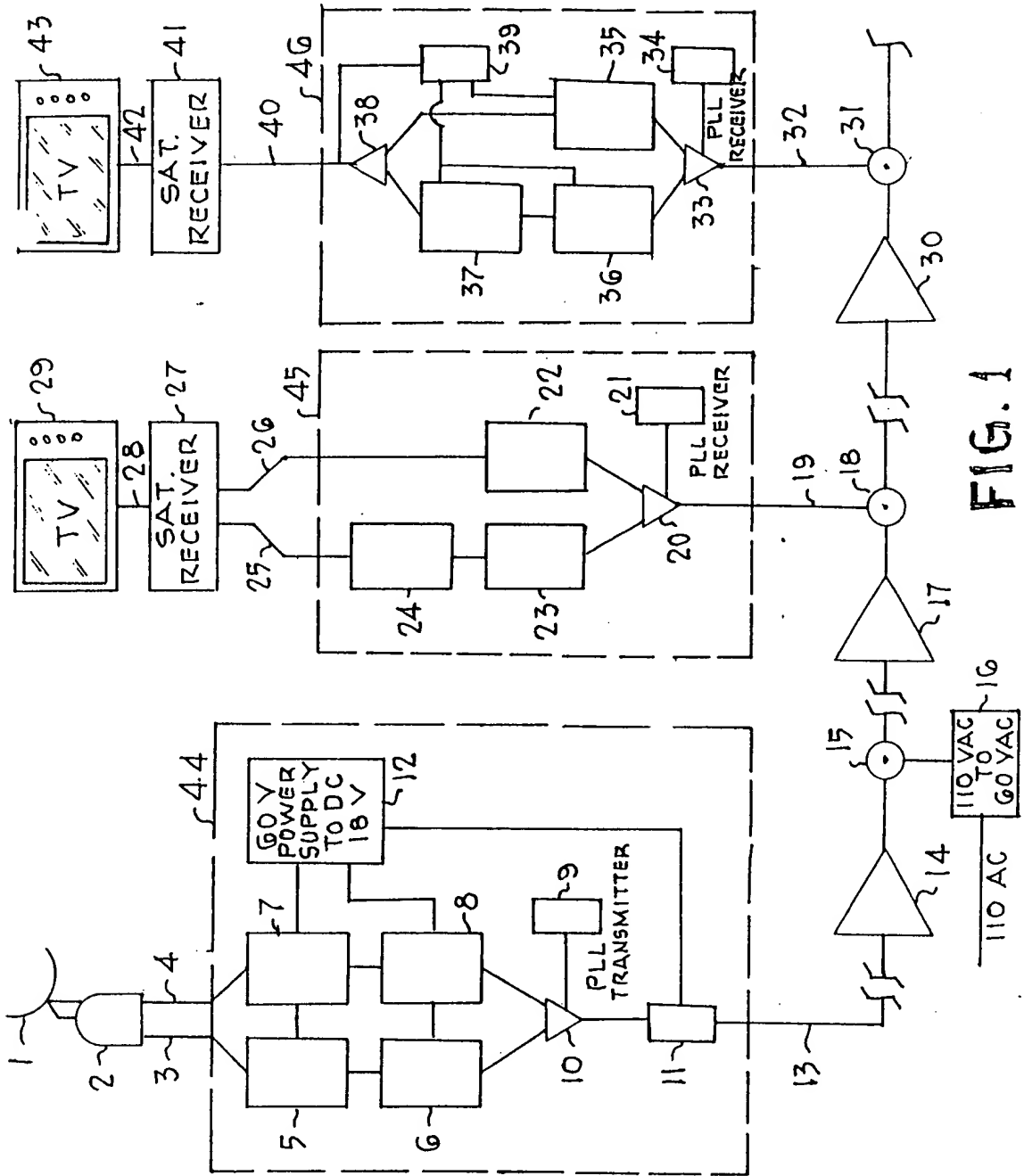


FIG. 1

**Gigacom, Inc.**  
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FORT WALTON BEACH, FL 32549  
850-244-5777 (Voice)  
850-244-4435 (FAX)  
e-mail: bell@ieee.org

**Randy Bell**

## **EXPERIENCE**

**Gigacom, Inc/Bell Engineering**, Fort Walton Beach, FL (1985 - Present) - Designed commercial and military RF/Microwave products for various clients. These include:

Wave Wireless Networking - Designed a 2.4/5.7 GHz translator for use in point to point wireless computer networking.

Rostra Precision Controls - Designed a low cost UHF remote control transmitter that met European emission standards and a 10 GHz automotive backup sensor radar.

Eglin Air Force Base - Designed a low cost miniaturized 1/2 watt 2.2 - 2.3 GHz synthesized missile telemetry transmitter that met IRIG 106 standards.

Wayne Dalton Corp. - Designed a low cost garage door remote control receiver and transmitter.

Baron Services, Inc. - Performed system integration and FCC type acceptance testing of a C and X band 330 and 250 KW pulsed doppler weather radar.

Precision Control Design, Inc. - Designed a low cost low power VHF biomedical telemetry receiver.

PCOM - Designed 5.7 - 5.9 GHz transceiver for use in ISM band. Transmitter had output power of 1 watt and receiver noise figure was less than 1 dB.

SmartSAT Engineering - Designed tri-band up/down converters covering the C, X and Ku communication bands and the Sampling Phase Detector section of a high performance 4 - 8 GHz Frequency Synthesizer.

Metric Systems Corp. - Designed various airborne military data links. This included a 1.8 GHz coherent transponder, 10 GHz receiver, 1.4 GHz MSK transceiver. Circuits designed included: 30 watt 1800 MHz, 30 watt UHF power amplifier, various frequency synthesizers, MSK modulator, FSK/PM modulator, PLL demodulator, GaAs FET low noise amplifier, PIN diode switch, high power limiter and an X-band detector. All circuits were designed to operate over the -54° to +75°C temperature range and met airborne shock and vibration requirements.

Ian - Conrad Bergan, Inc. - Performed study to determine feasibility of building 10 GHz FM-CW radar. Built prototype 10 GHz FM-CW radar and developed a technique for compensation of nonlinear VCO tuning characteristics.

International Systems and Software, Inc. - Designed a low cost synthesized PSK receiver for use in the reception of High Resolution Picture Transmission data from the TIROS-N series of meteorological satellites. This receiver was designed to acquire, track and demodulate a high data rate signal with a large Doppler shift.

StarTech Innovations, Inc. - Designed the transmitter section of a VHF (138-250 MHz) wireless microphone system. This design meets both FCC and European telecommunication standards.

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MicroSystems, Inc. - Designed a Drone Target and Control System transponder. This system operated from 5.4 - 5.9 GHz with a power output of 15 watts. Microwave/RF circuits designed included an LNA, mixer, power amplifier, dielectric resonator oscillator, PIN diode antenna switch and pulse modulator, AGC attenuator, log IF amplifier, and tunable band pass filter.

**Vitro Services**, Fort Walton Beach, FL (1984 -1985) - Designed RF circuitry of an IF monopulse radar processor..

**General Electric**, Lynchburg, VA (1983 - 1984) - Redesigned the receiver and exciter section of an existing cellular radio base station to operate in the GE proposed Personal Radio Communications Service Band (900- 950 MHz).

**Gardiner Communications**, Garland, TX (1982 - 1983) - Responsible for the design of components in a 3.7-4.2 GHz satellite receiver and a CATV RF modulator (54-300 MHz). Circuits designed include a synthesized local oscillator (600-900 MHz), microstrip bandpass filters, power divider and directional coupler, a subharmonic mixer and numerous LC type VHF and UHF filters.

**GTE Corp.**, Huntsville, AL (1982) - Designed a low cost 49 MHz FM transmitter for use in a cordless telephone.

**RCA**, Meadowlands, PA (1981) - Designed a VHF temperature compensated crystal oscillator and circuitry for phase locking the visual and aural exciters of a VHF television transmitter.

**Sperry Univac Inc.**, Salt Lake City, UT (1980 - 1981) - Designed RF and microwave components for a Spread Spectrum data link. Assignments included the design of a wideband UHF power amplifier, VHF IF amplifier strip with AGC , X and Ku band GaAs FET amplifiers, several X band filters and a multi-channel S band modulator. Extensive use was made of the Compact CAD program for circuit design and optimization.

**Metric Systems Corp.**, Fort Walton Beach, FL (1978 - 1980) - Designed analog and digital circuits and did systems analysis on a multi-beam high power search radar, AN/MPS-T9.

**Motorola Inc.**, Fort Lauderdale, FL (1977 - 1978) - Responsible for the design of a low power VHF mixer/oscillator for a Paging Receiver and system test comparing the intermodulation distortion and paging sensitivity of old and new receivers.

## Education

**University of California**, Los Angeles, CA (May 1981) - Attended short course: Microwave Circuit Design.

**University of Florida**, Gainesville, FL (1976 -1977) - Received Master of Engineering Degree in Electrical Engineering. Main areas of interest: Communications Theory, Digital Signal Processing and Applied Electronics. Grade point average: 3.92/4.0.

**University of Florida**, Gainesville, FL, (1974 - 1975) - Received Bachelor of Science Degree in Electrical Engineering. Graduated with honors with a grade point average of 3.49/4.0. Member Tau Beta Pi, Eta Kappa Nu and Phi Kappa Phi.

**Pensacola Junior College**, Pensacola, FL (1971 - 1973) - Received Associate of Science Degree in Electrical Engineering Technology.

## Gigacom, Inc. Facilities

Gigacom, Inc. maintains a complete electronics development laboratory with test and measurement capabilities extending from DC to 22 GHz.




#### RF/MICROWAVE TEST EQUIPMENT

Tektronix Model 2247A Oscilloscope  
TBE Electronics Model 214 LC Meter  
Marconi Model 2031 Signal Generator  
Marconi Model 6960A RF Power Meter  
Eaton Model 2075/205 Noise Figure Meter  
Hewlett-Packard Model 3478A Multimeter  
Wiltron Model 6409 Scalar Network Analyzer  
EIP Model 545 Microwave Frequency Counter  
Hewlett-Packard Model 8112A Pulse Generator  
Hewlett-Packard Model 3577A Network Analyzer  
Hewlett-Packard Model 8505A Network Analyzer  
Hewlett-Packard Model 5335A Universal Counter  
Giga-tronics Model 600 Microwave Signal Generator  
Hewlett-Packard Model 8340A Synthesized Sweeper  
Farnell Model AMM2000 Automatic Modulation Meter  
Hewlett-Packard Model 70300A/70301A Tracking Generator  
Hewlett-Packard Model 71210C Microwave Spectrum Analyzer  
Hewlett-Packard Model 3780A Pattern Generator/Error Detector  
Wandel and Goltermann Model TSA-1 Spectrum/Network Analyzer  
Stanford Research Systems Model DS345 Synthesized Function Generator

#### CAD/CAE SOFTWARE

Tesla - System Simulator  
Vellum - Mechanical Design  
SysCalc - RF System Analysis  
Coda - Crystal Oscillator Design  
CiAO - Matching Network Design  
WaveCon - Microwave Filter Design  
TxRx Designer - RF System Analysis  
Spectra Plus - Audio Spectrum Analysis  
Protel - Schematic and Printed Circuit Board Design  
Acolade - Communications Link Analysis and Design  
Touchstone - Linear RF/microwave Circuit Analysis and Optimization  
Microwave Office - Linear/Nonlinear RF/Microwave Circuit Analysis and Optimization



# Gigacom, Inc.

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## SUMMARY OF EXPERIENCE AND CAPABILITIES

Telemetry Transmitters  
RF and Microwave Design  
Military/Commercial Data Links  
Simulation and Analysis  
VCO and Synthesizer Design  
Low Power Radar  
Microcontroller Design

Transmitter Design and Development  
Receiver Design and Development  
Fully Equipped Microwave Laboratory  
Environmental Testing  
Printed Circuit Board Design  
Commercial/Mil Spec Manufacturing

## Experience and Capabilities

### Circuit Design and Development

#### Telemetry Transmitters

Model GT-100, Synthesized 2.2 – 2.3 GHz, ½ watt power output, 1 MBPS data rate, isolator protected, 2.7 cubic inch volume.

Model GT-200, Synthesized 2.2 – 2.3 GHz, ½ watt power output, 2 MBPS data rate, internal premodulation filter, isolator protected, 1.5 cu. inch volume.

#### Data Links

RISPO Data Link, 1350 – 1450 MHz, MSK Modulation

P4B ACMI Data Link, 1800 MHz, with coherent phase modulated ranging tones and FSK data modulation

C Band Drone Target and Control System transponder

#### Radar

10 GHz Diplexed Doppler Automotive backup collision avoidance sensor.

10 GHz FM/CW Fluid level sensor.

High Power X and C band Pulsed Doppler Weather radar transmitter.

AN/MPS-T9 Search radar

#### Receivers

Body core temperature data receiver

Tiros-n satellite data receiver

Garage door receivers

VHF paging receiver

Sparrow missile radar receiver

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### Power Amplifiers

1800 MHz, 30 watt class C

225-400 MHz 20 watt, Class A

5.7 – 5.9 GHz 1 and 2 watts, class A

### Components

Filters

Low noise amplifiers

Voltage controlled oscillators

Transmit/Receive switches

Limiters

Sampling Phase Detectors

Pin diode switches

Dielectric Resonator Oscillators

### Up/down Converters

X, C and Ku band up/down converter

2.4 /5.7 GHz High power WLAN translator

### Frequency Synthesizers

Various synthesizers operating from 100 MHz to 4 GHz

### Fully Equipped Laboratory

Test equipment covering DC – 26 GHz

Vector and Scaler Network Analyzer

Spectrum Analysis

### Simulation and Analysis Capabilities

Applied Wave Research Microwave Office 2001

Mathematica

TESLA (system simulation)

Autocad 2000

### Engineering Services

Printed circuit design using Protel 99SE and PCAD-2000

### Manufacturing

Manufacturing to military or commercial specifications available through local contract manufactures.

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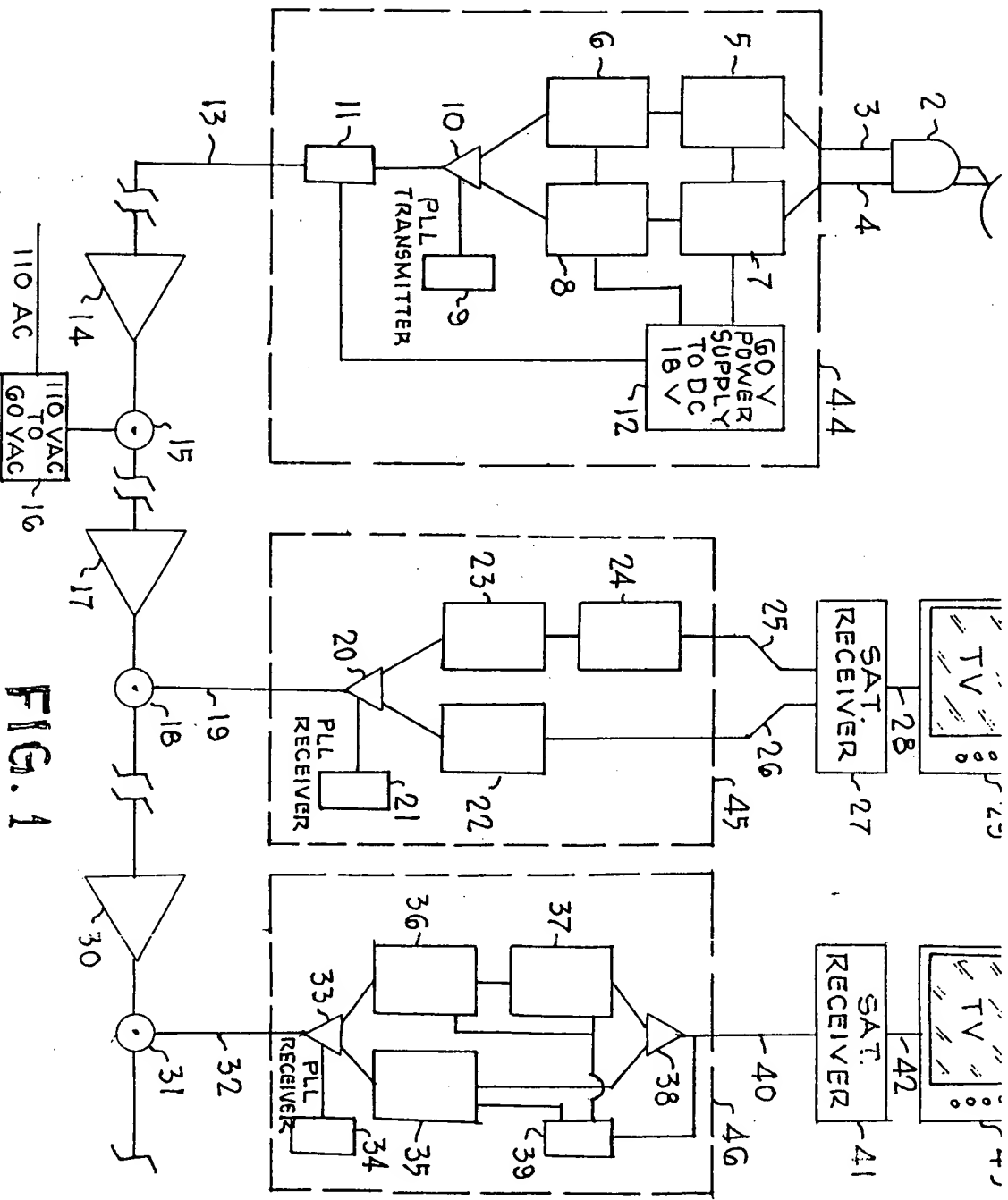


FIG. 1